



LOUISIANA WATER RESOURCES ASSESSMENT FOR SUSTAINABILITY AND ENERGY MANAGEMENT

Water Resources Commission Update
August 17, 2015



**THE WATER INSTITUTE
OF THE GULF™**



PROJECT GOALS

- Establishing a standardized set of measures: evaluating regional water supply
- Setting baseline water budgets - groundwater and surface water
 - Identifying resources in highest need of action to support sustainability
- Set up a process
 - Convert available types of water data in various regions of the state into a more universal format
 - Detect potential problems in time to take actions:
 - Manage impacts to water quality or availability
 - Would otherwise have meant greater energy costs to consumers.



PROJECT PROCESS

- Take the large amount of data and information and develop a Framework that makes it useful to decision makers
- Gage the sustainability of water resources in light of present and projected uses

Sustainability: A balance between use and supply that causes no further impairment to water resources, and maintains or improves the current health of these systems

- Develop a system for analyzing and communicating these facts and figures to the public and key water managers around the state



PROJECT ACTIVITIES



Activity 1

Develop a Framework for appraising the health and sustainability of Louisiana's water resources.



Activity 2

Review of Data Sources/Availability and select certain hydrologic units for detailed assessment.



Activity 3

Conduct the appraisal of the hydrologic units selected through application of the Framework.

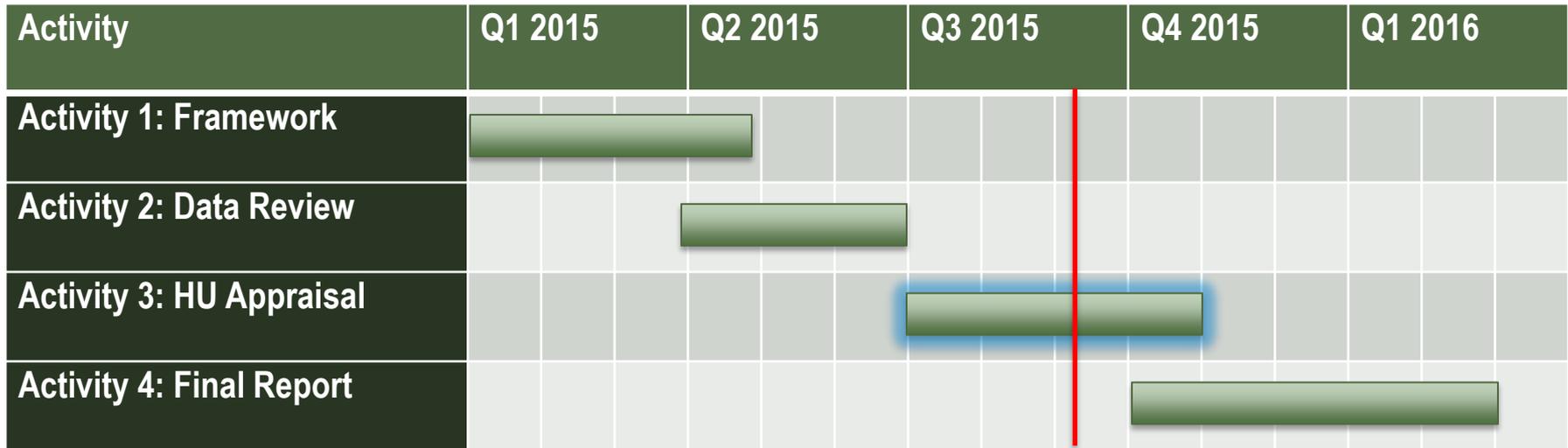


Activity 4

Prepare a report that describes the Framework, its application to specific selected hydro units, and the resulting assessment of water resources sustainability.



TIMELINE OF KEY ACTIVITIES



PROJECT ACTIVITIES



Activity 1

Develop a Framework for appraising the health and sustainability of Louisiana's water resources.



Activity 2

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Activity 4

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STATUS UPDATE: ACTIVITY 1



Review Existing Frameworks



Key Components of Plans



Technical Coordination Team



Develop Components of Draft Framework

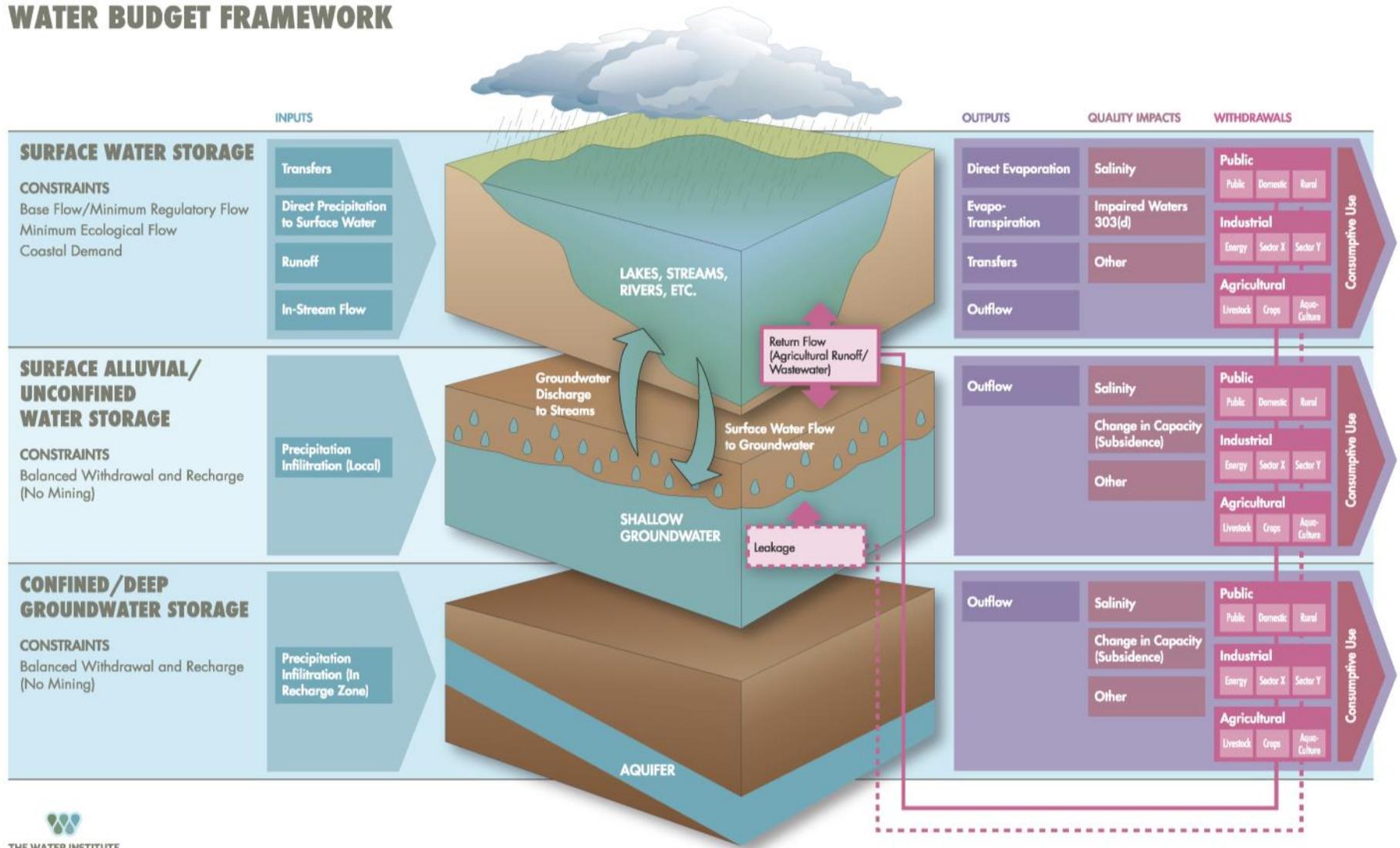


CRITICAL INFORMATION FOR WATER MANAGEMENT

- Data needs to construct a *Water Budget*:
 - The quantity of water in each hydrologic unit
 - surface water
 - groundwater
 - Where it is located
 - Its input, output and movement
 - Quantity available for various uses [both natural and human]
 - Current and future uses
 - Future sustainability [balanced supply and demand]



WATER BUDGET FRAMEWORK



PROJECT ACTIVITIES



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Activity 4

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STATUS UPDATE: ACTIVITY 2



inventory and Initial Inspection of Data



Identify Data Gaps



Technical Coordination Team



Identify Hydro Units

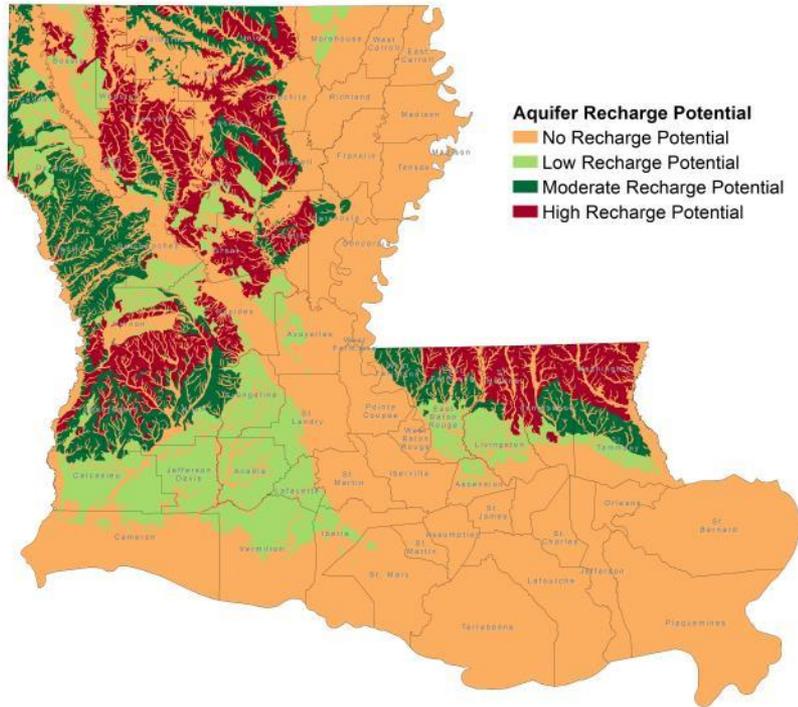


STATUS UPDATE: ACTIVITY 2

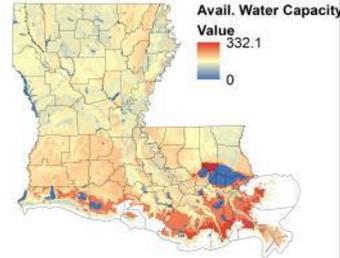
- **Initial Inventory of Data Sources**
 - **Water Supply**



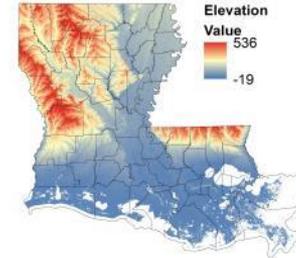
Physical Geography Components of the Louisiana Water Budget



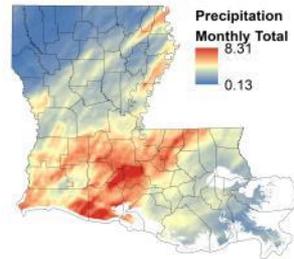
Data Source: Louisiana DEQ 1988



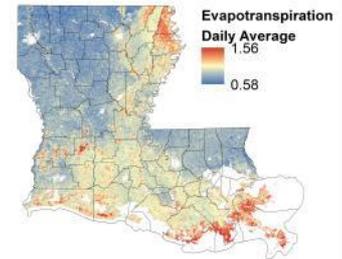
Data Derived from USDA SSURGO



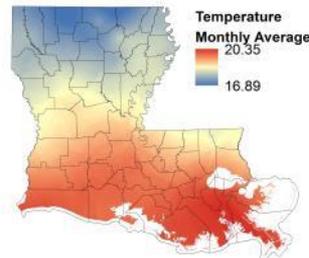
Data Source: USGS National Elevation Database



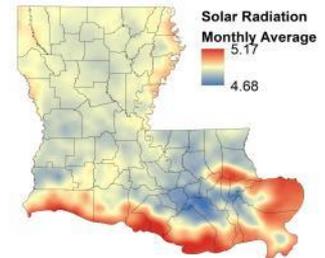
Data Derived from National Weather Service AHPs



Data Source: MODIS 16 Imagery



Data Source: NOAA National Climate Data Center



Data Driven from USGS NED and NOAA Solar Calculator

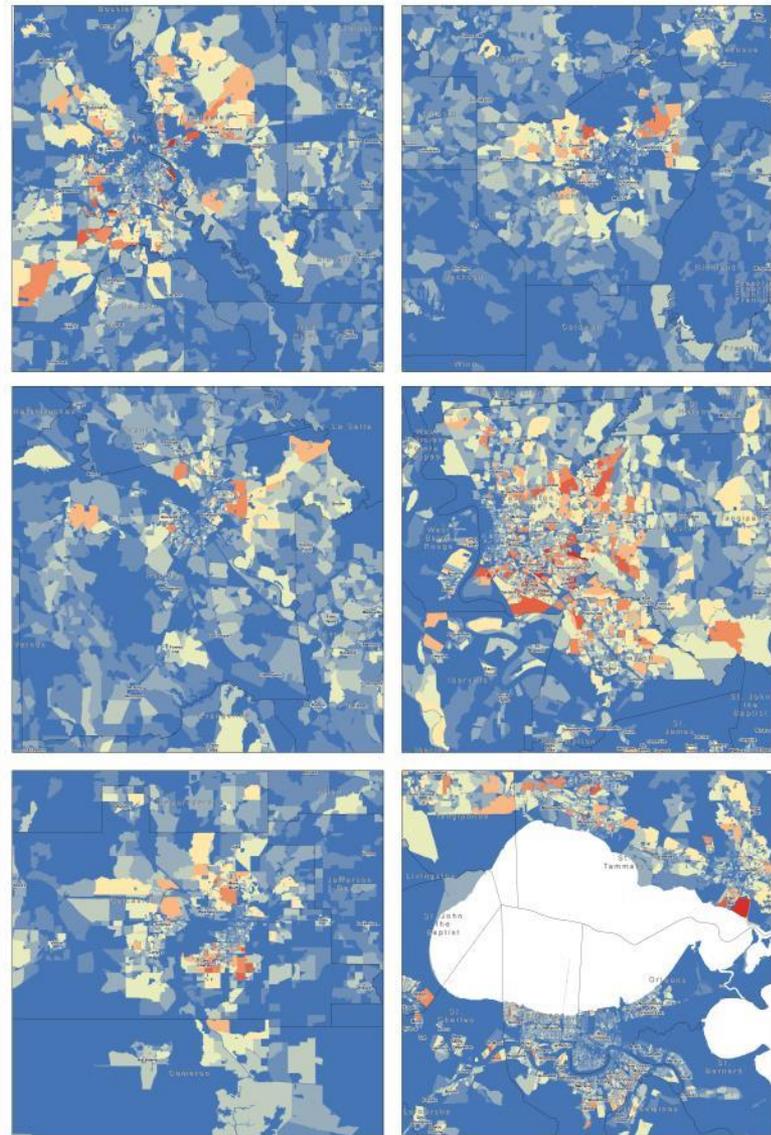
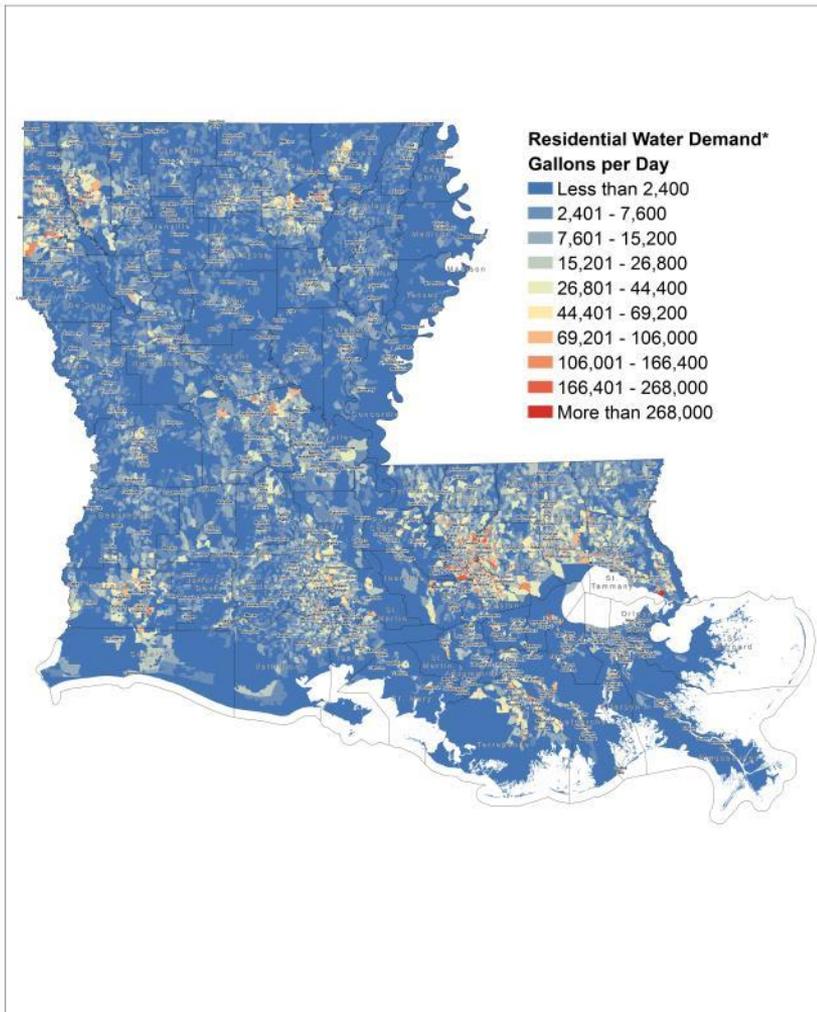


STATUS UPDATE: ACTIVITY 2

- **Initial Inventory of Data Sources**
 - **Water Supply**
 - **Water Demand and Energy Requirements**



Estimated Daily Household Water Demand in Louisiana

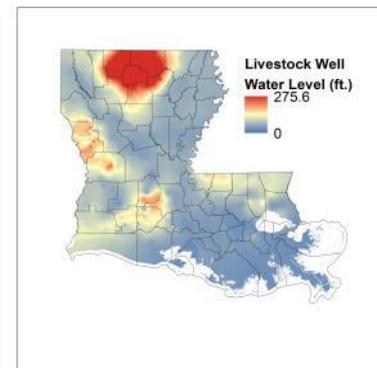
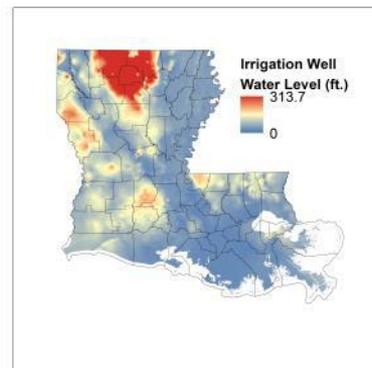
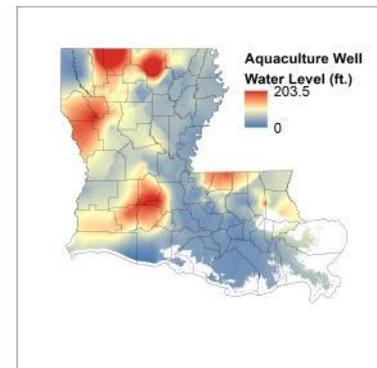
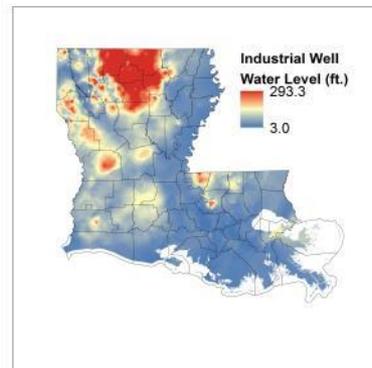
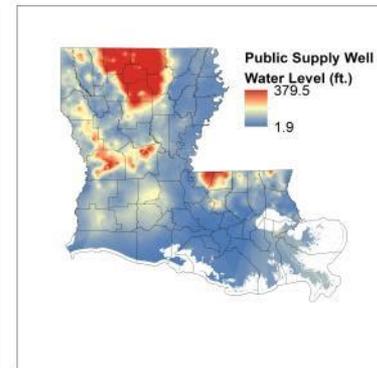
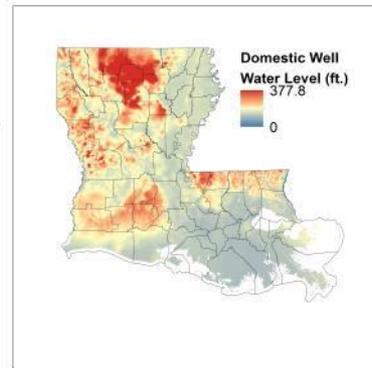
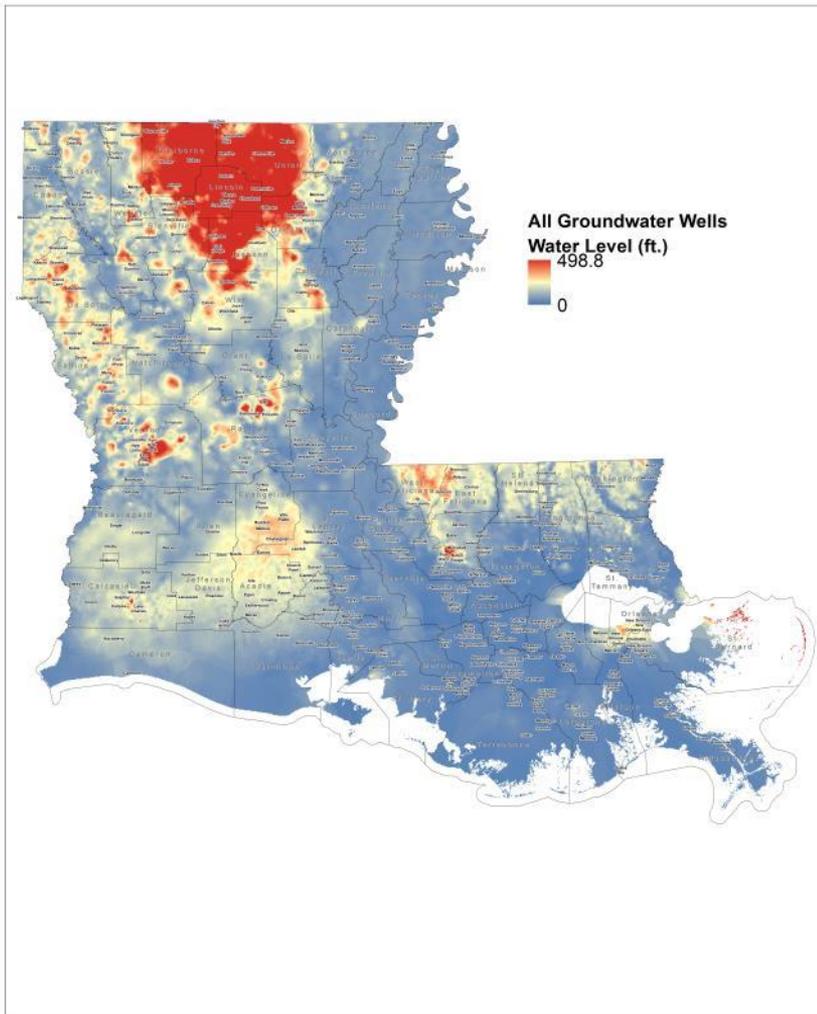


* Values estimated based upon average domestic water use of 400 gallons per day for a family of four

Data: Adapted by The Water Institute of the Gulf from U.S. Census Bureau



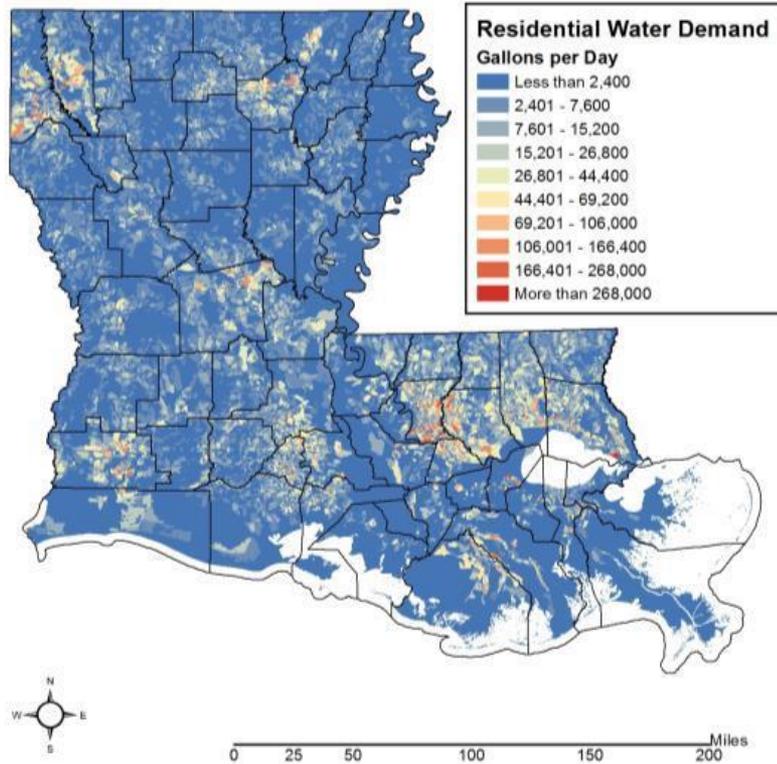
Water Levels in Louisiana Groundwater Wells



Data: Adapted by The Water Institute of the Gulf from Louisiana DNR

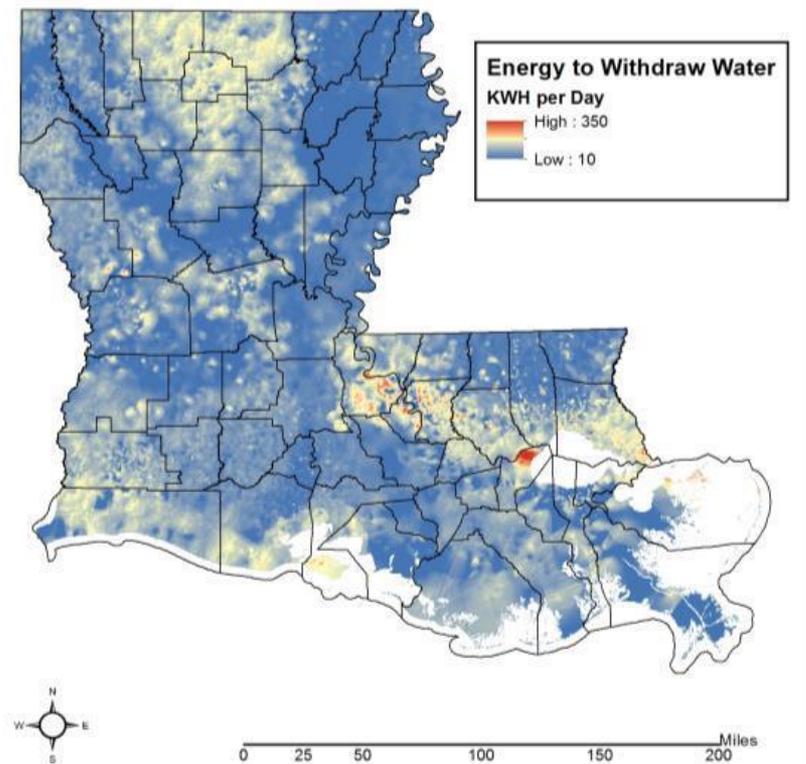


Estimated Daily Household Water Demand*



Data: Adapted by The Water Institute of the Gulf from U.S. Census Bureau

Estimated Energy Cost to Draw Water*



Data: Adapted by The Water Institute of the Gulf from Louisiana Department of Natural Resources

* Values estimated based upon average domestic water use of 400 gallons per day for a family of four using an electric domestic water well pump using 1.16 kwh per day for each 10 feet of water lift

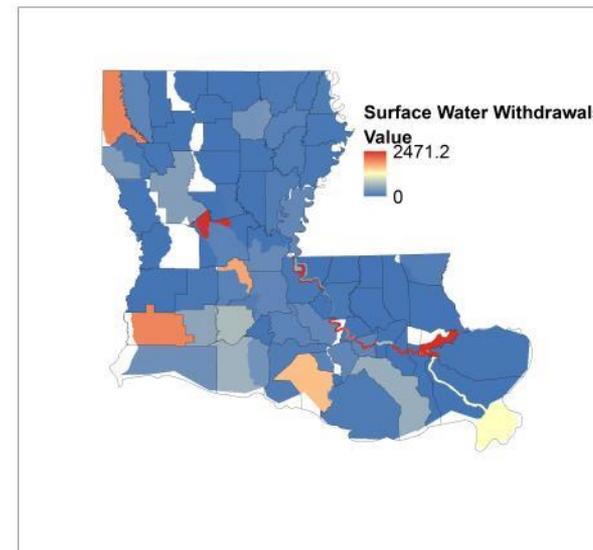
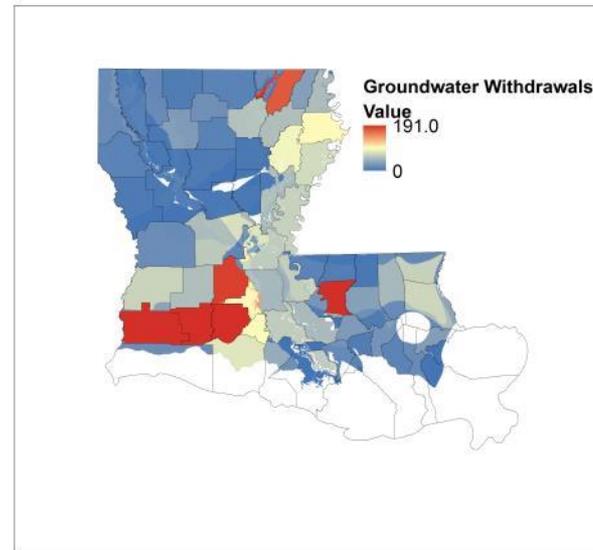
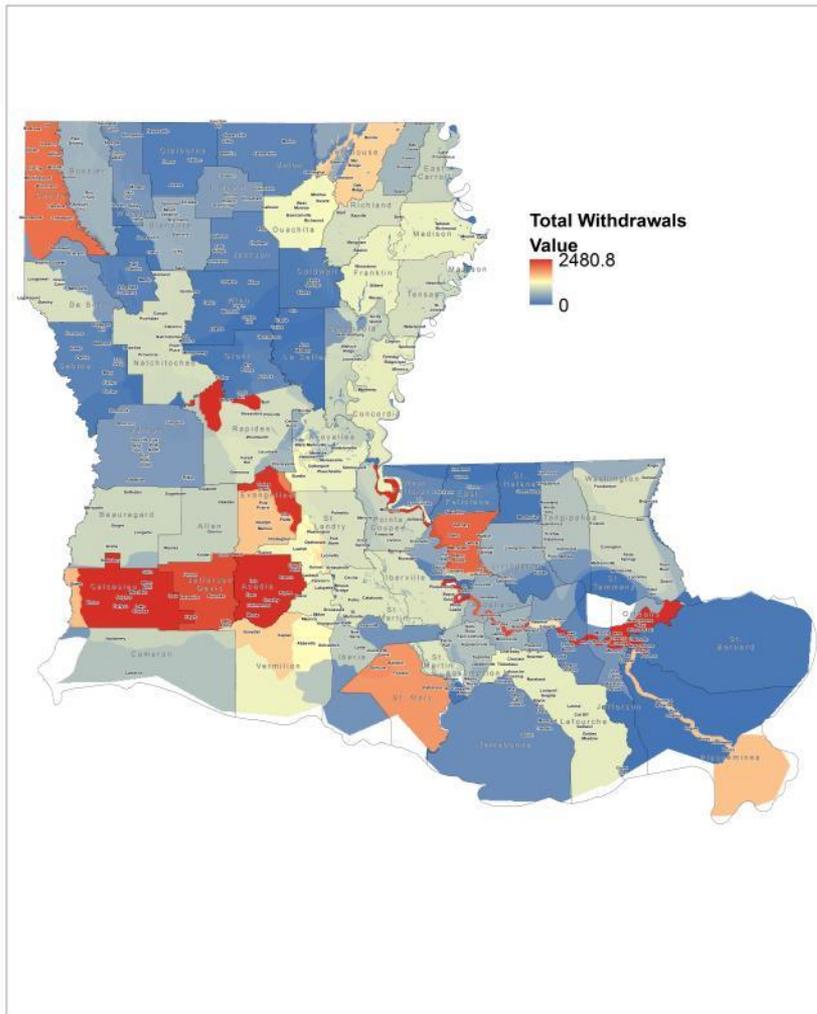


STATUS UPDATE: ACTIVITY 2

- **Initial Inventory of Data Sources**
 - **Water Supply**
 - **Water Demand and Energy Requirements**
 - **Water Usage**



Water Withdrawals (Mgal/d) in Louisiana

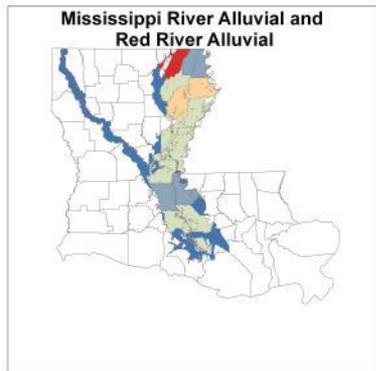
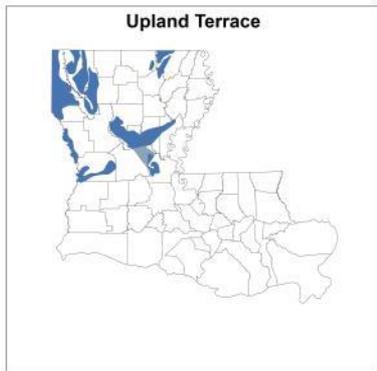
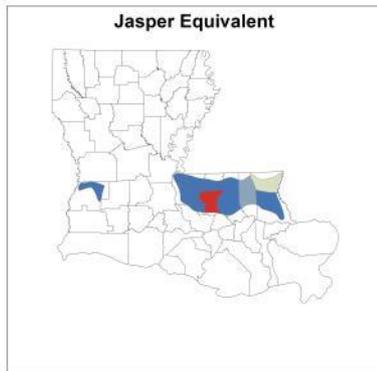
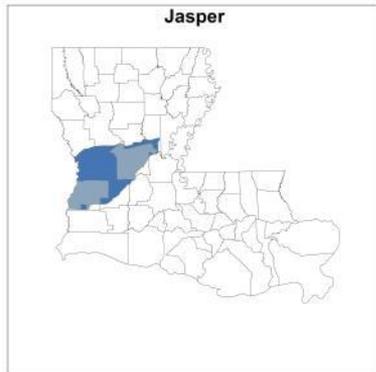
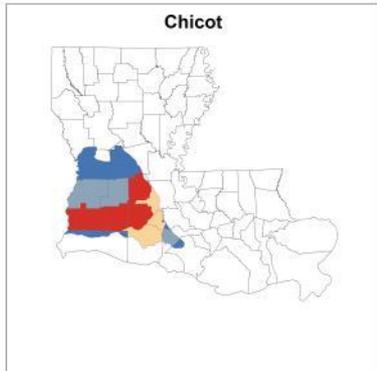
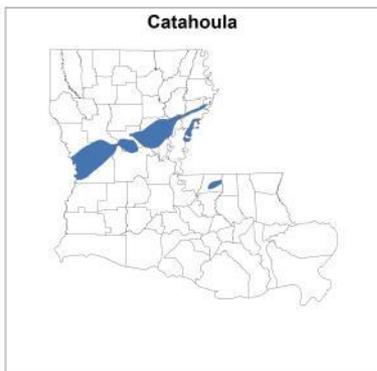
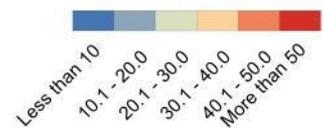


Data Source: USGS and Louisiana DOTD 2010





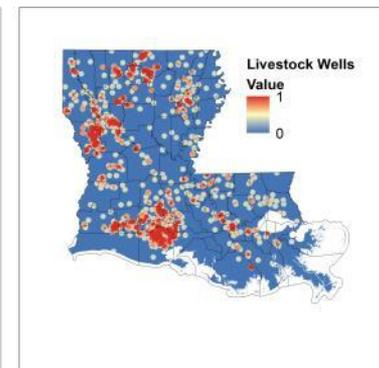
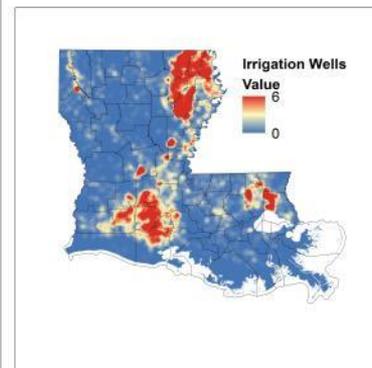
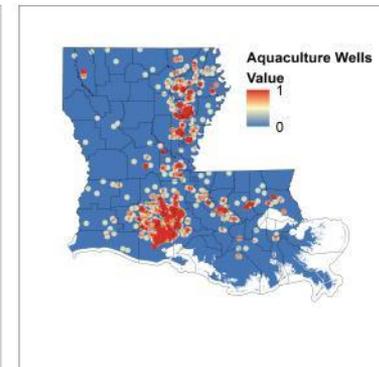
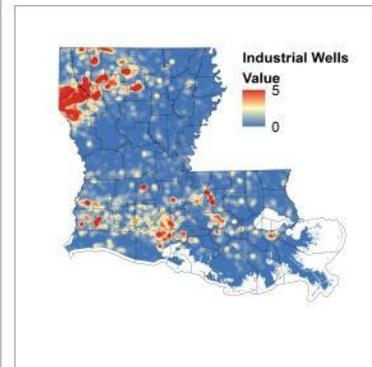
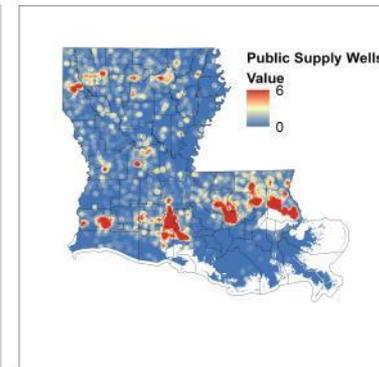
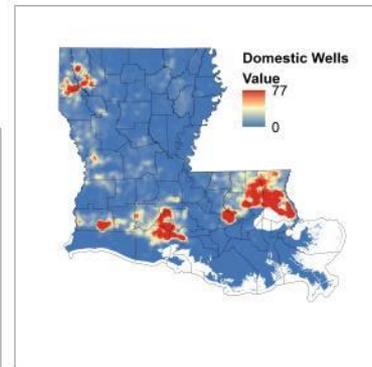
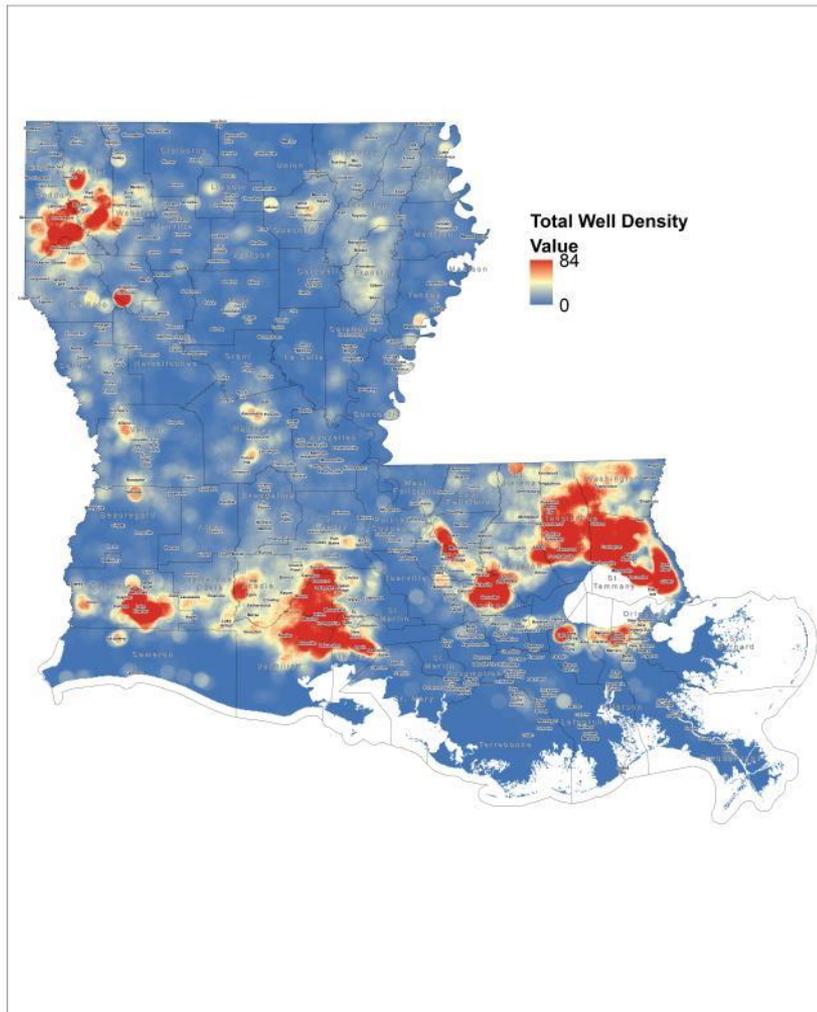
Groundwater Withdrawals from Louisiana Aquifers (Mgal/d)



Data Source: USGS and Louisiana DOTD 2010



Groundwater Well Density in Louisiana



Data: Adapted by The Water Institute of the Gulf from Louisiana DNR



STATUS UPDATE: ACTIVITY 2



inventory and Initial Inspection of Data



Identify Data Gaps



Technical Coordination Team

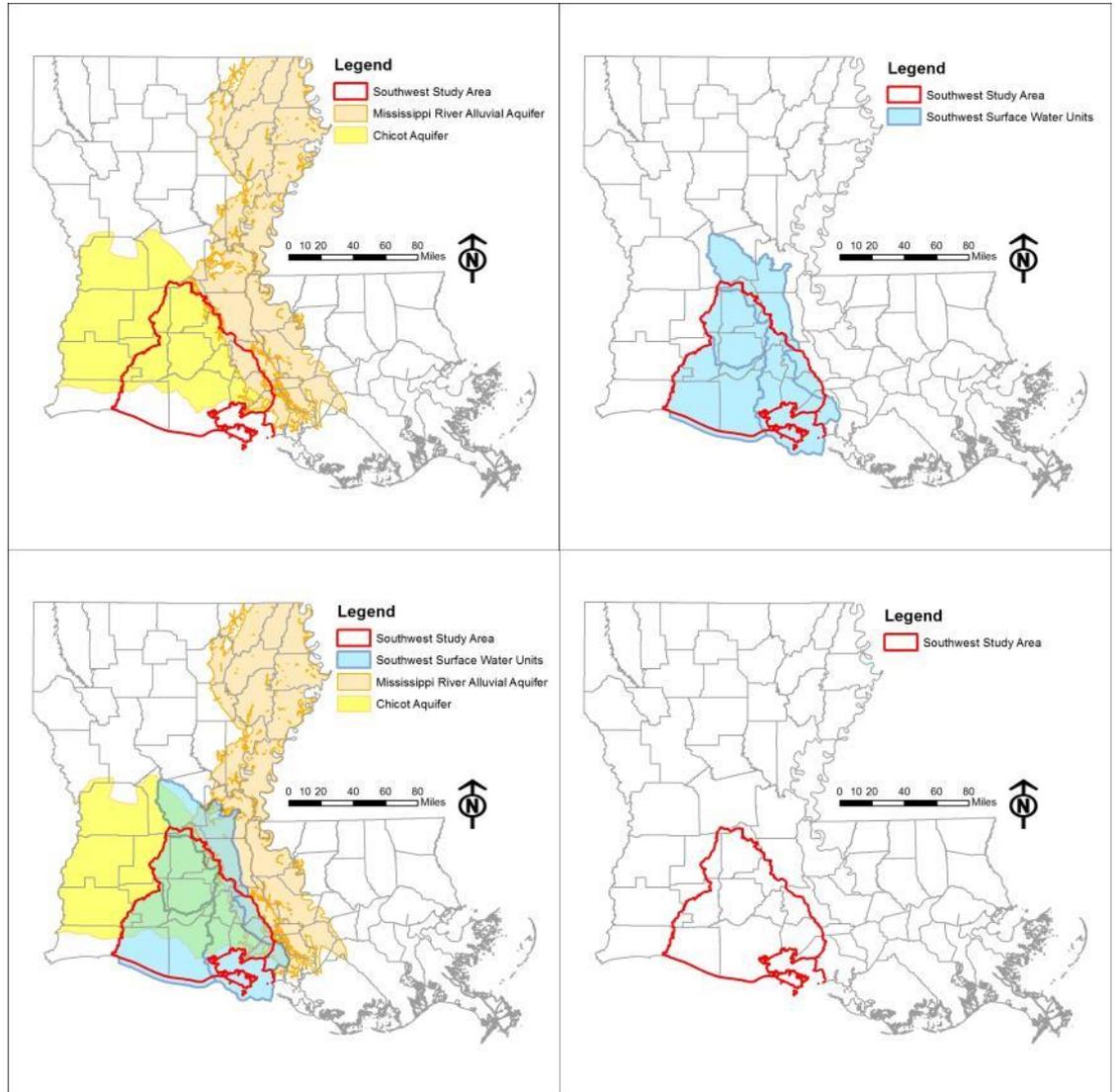


Identify Hydro Units/Study Areas



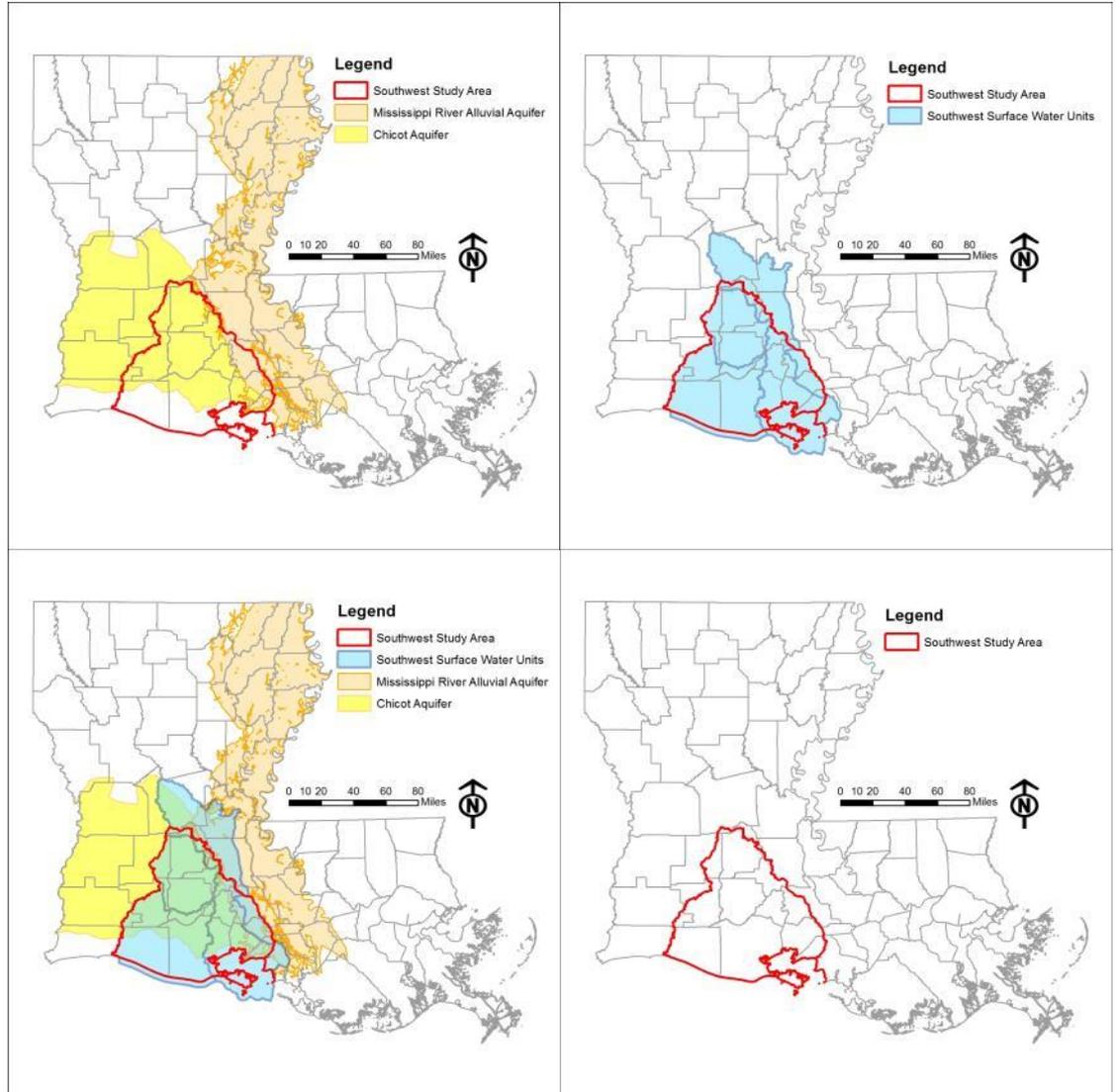
SELECTING STUDY AREAS

- Extent of water bearing units
 - Surface water basins
 - Groundwater aquifers
- Water demand
- Data availability



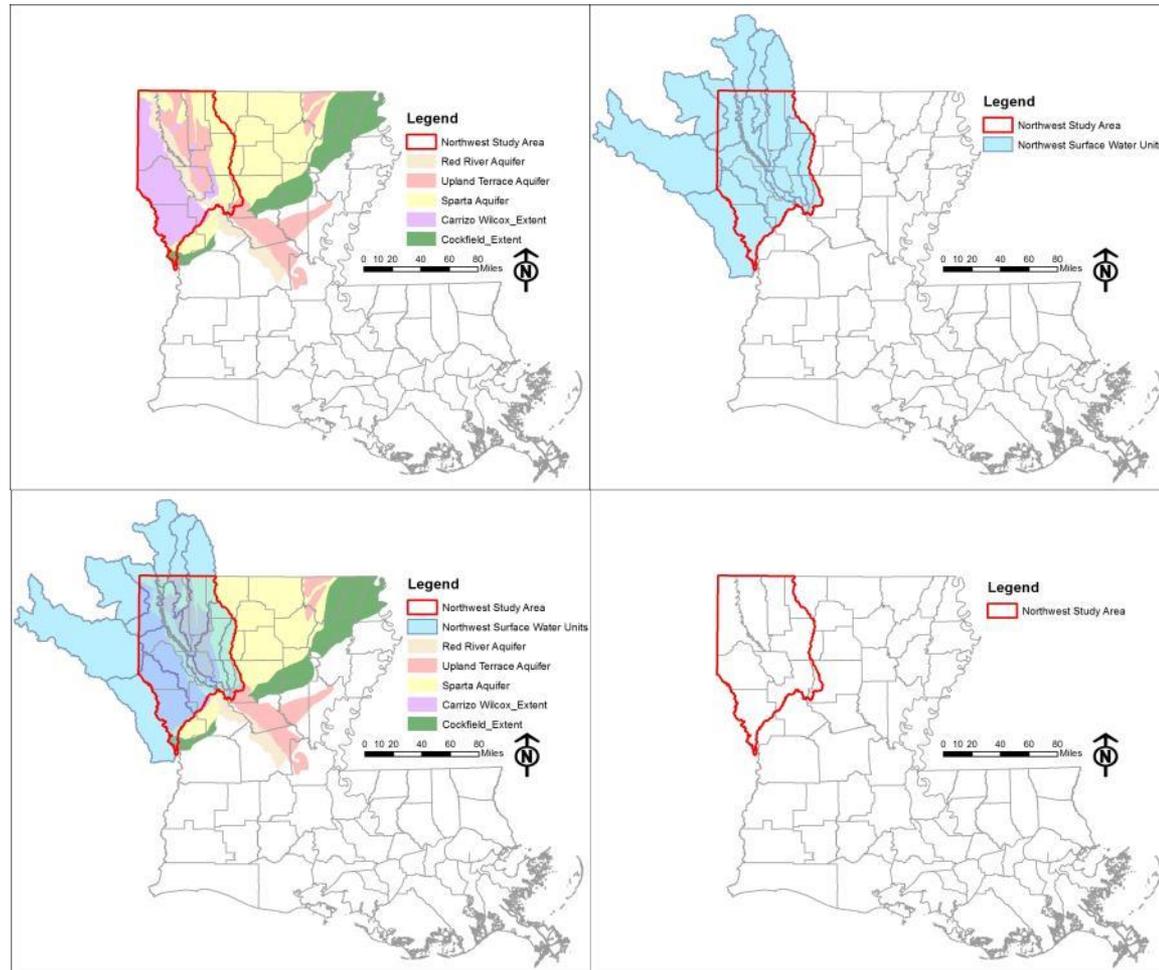
PILOT STUDY AREA: SWLA

- East Chicot Aquifer Area
- Surface water basins:
 - Bayou Teche
 - Vermilion River
 - Mermentau River
- mix of demand uses
 - Agriculture (including rice)
 - Livestock
 - Industry
 - Urban/rural domestic
 - Coastal



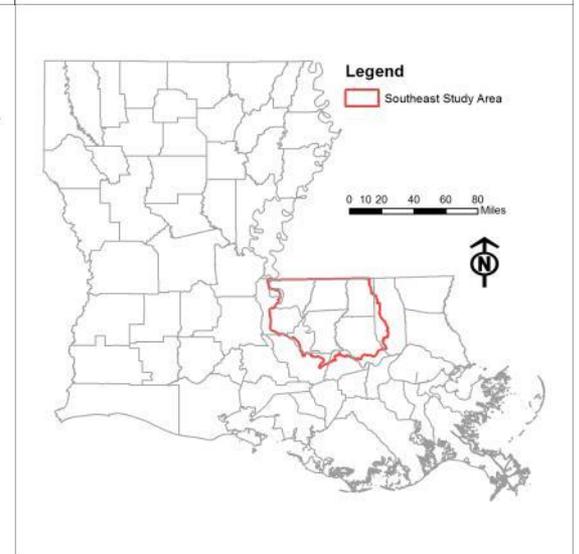
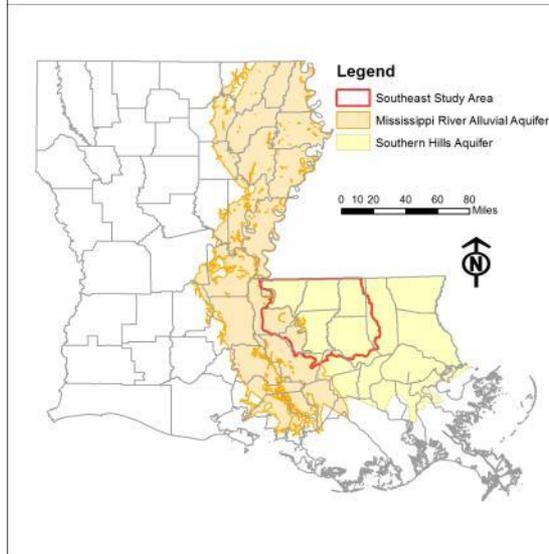
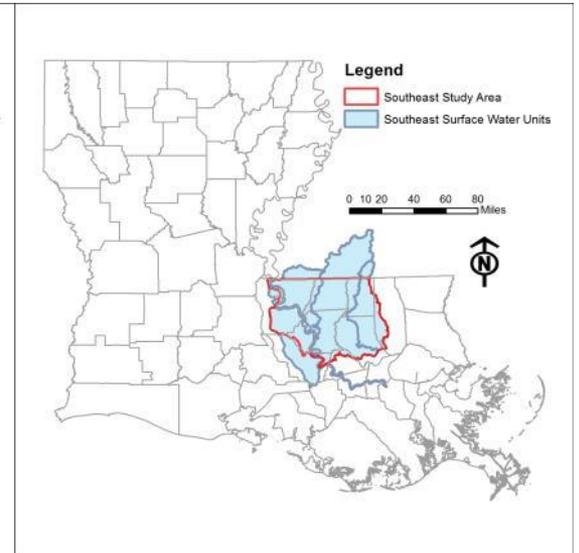
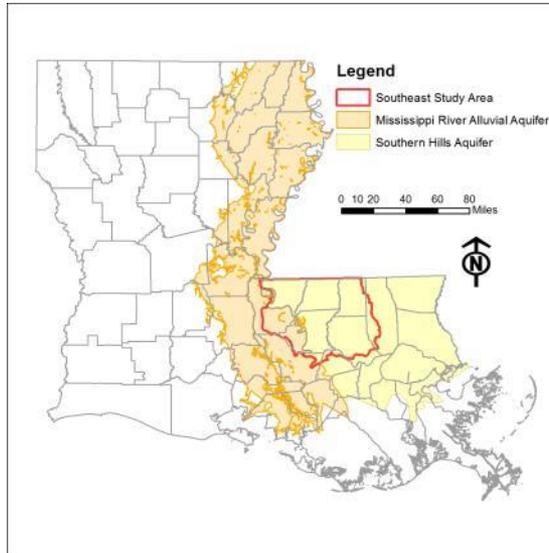
NWLA STUDY AREA

- Carrizo-Wilcox Aquifer Area
- Surface water basins:
 - Bayou Pierre, Black Lake Bayou, Bodcau Bayou, Caddo Lake, Cross Bayou, Loggy Bayou, McKinney-Poster Bayous, Middle Red-Coushatta River, Middle Sabine, Red Chute, Saline Bayou
 - Toledo Bend Reservoir
- mix of demand uses
 - Agriculture
 - Livestock
 - Industry
 - Urban/rural domestic



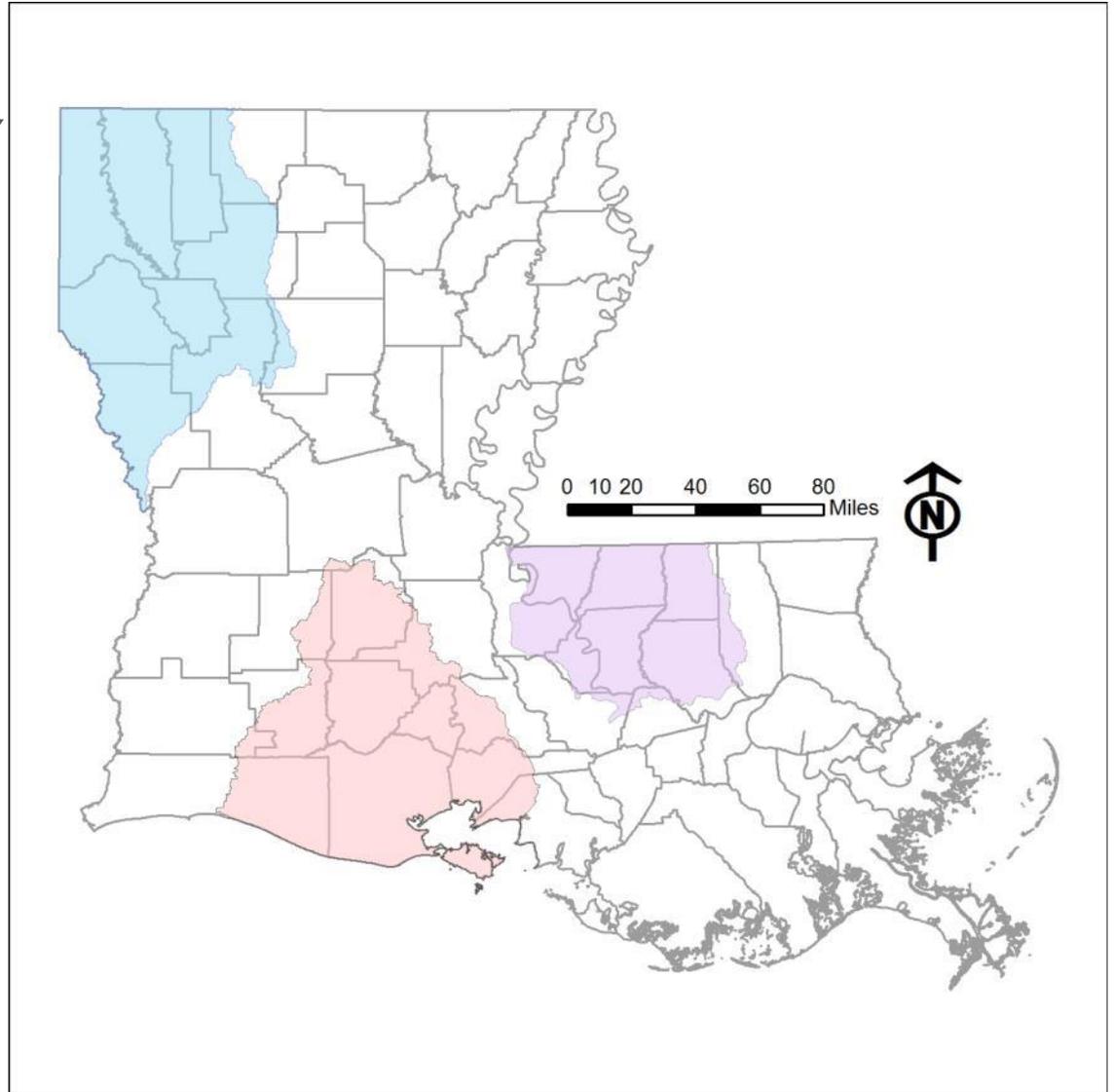
SELA STUDY AREA

- West Southern Hills Aquifer Area
- Surface water basins:
 - Amite River
 - Bayou Sara-Thompson Creek
 - Lower Grand
 - Lower Mississippi River-Baton Rouge
 - Tickfaw River



SELECTED STUDY AREAS

- SWLA - East Chicot Aquifer Area
- NWLA - Carrizo-Wilcox Aquifer Area
- SELA - West Southern Hills Aquifer Area
- Chosen for:
 - Data availability
 - Mix of uses
 - Existing supply/ demand imbalances
 - Cover different parts of state/ unique issues



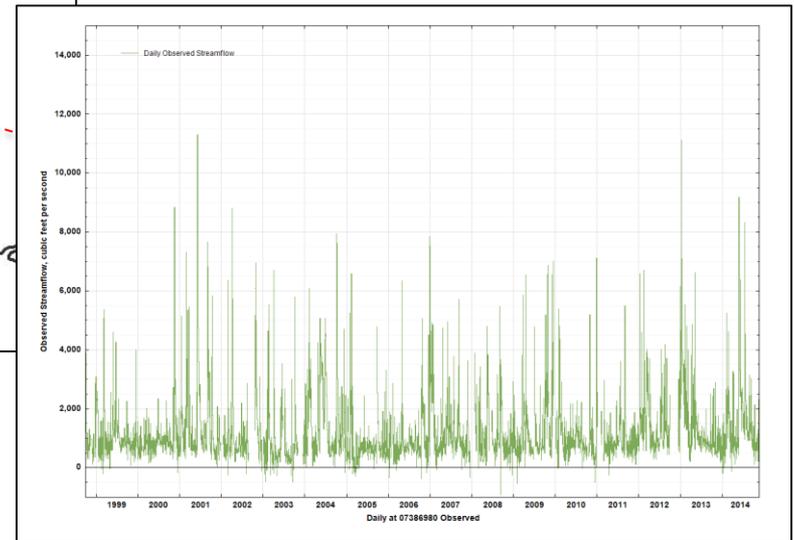
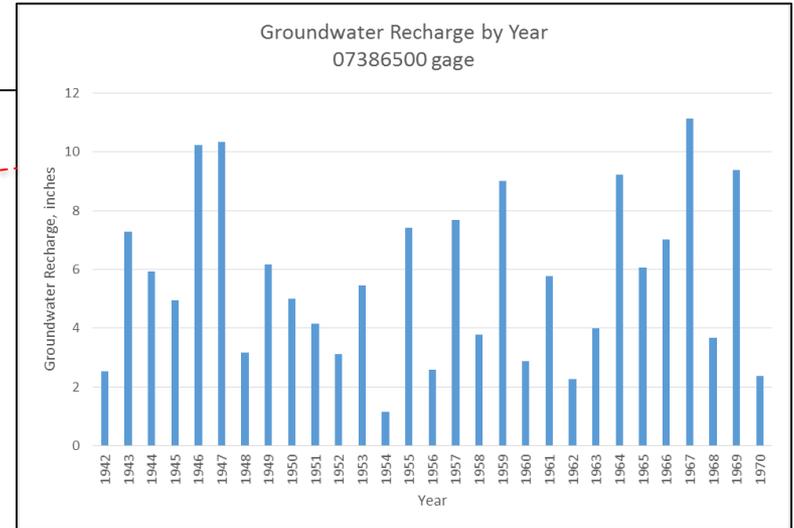
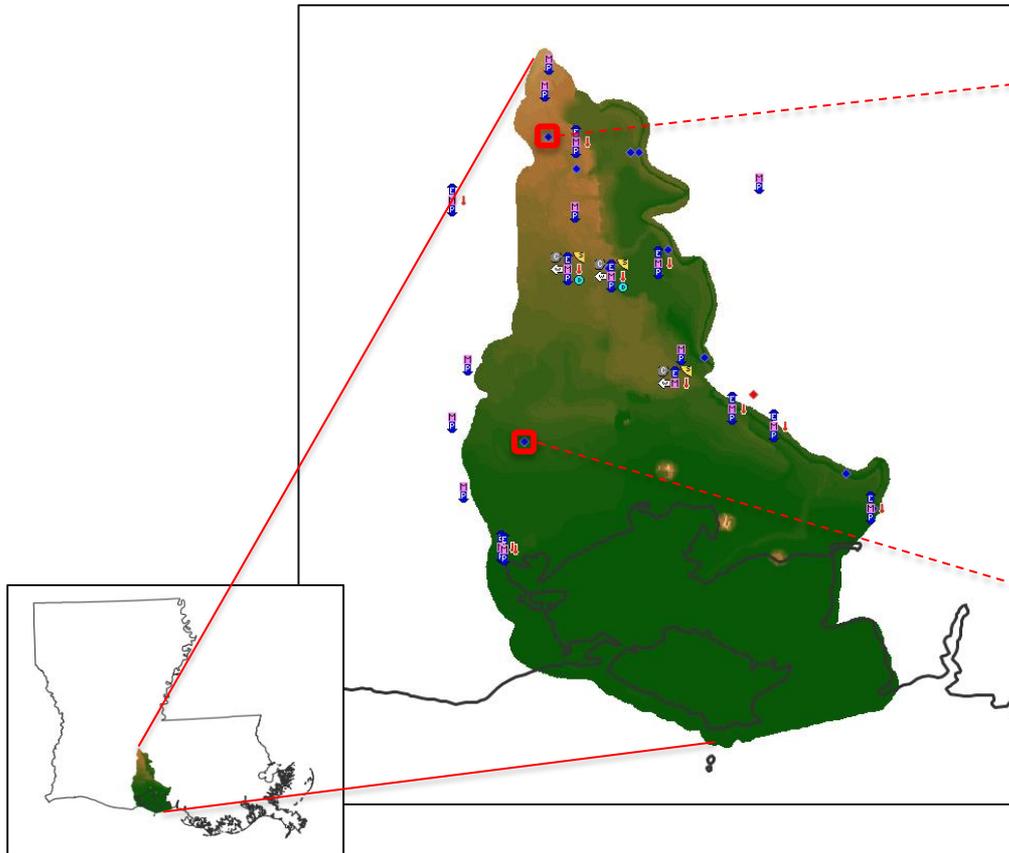
PROJECT STATUS/ PATH FORWARD

- **Next Steps**

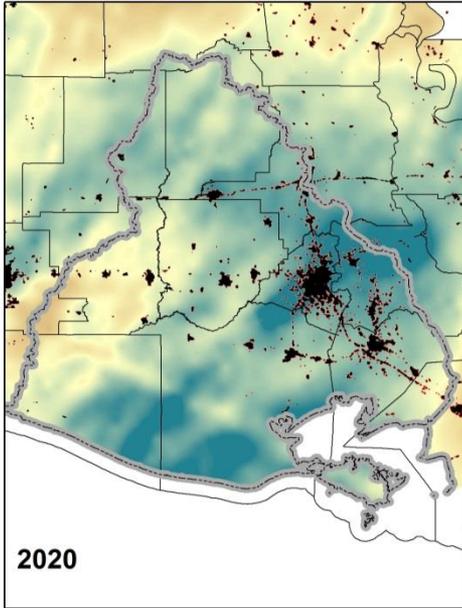
- **Activity 3:** Conduct the appraisal of the hydro units selected for application of the Framework
- Apply framework analysis to pilot study area (SWLA) – ongoing
- Apply framework analysis to NWLA and SELA study areas
- Incorporate Future Supply and Demand Scenarios



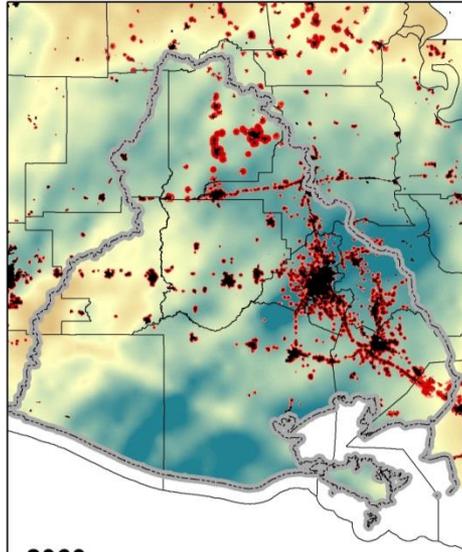
EXAMPLE ANALYSIS: VERMILION RIVER



Population Growth Projections in the Southwest Study Area for the Louisiana Water Budget



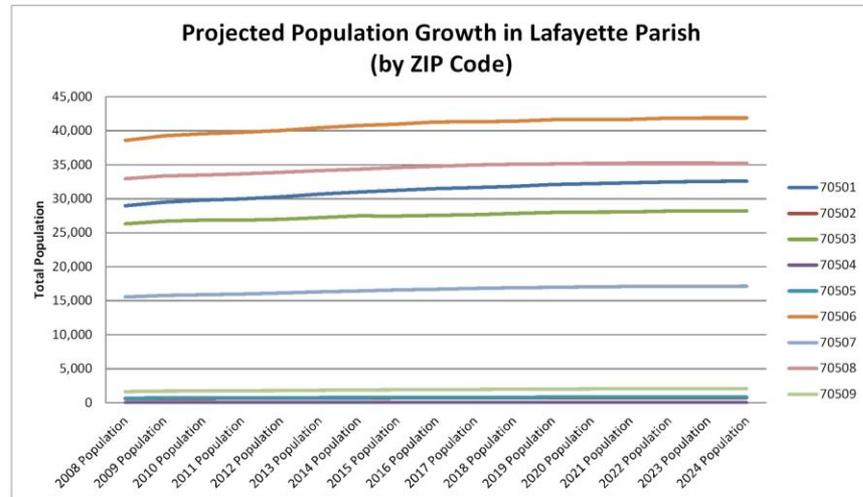
2020



2060

Data Source: University of California, Santa Barbara

EXAMPLE ANALYSIS: IMPACTS OF POPULATION GROWTH AND URBANIZATION ON WATER SUPPLY AND DEMAND



Data Source: Economic Modeling Specialists, International





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THANK YOU

Please send comments to appliedresearch@thewaterinstitute.org

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